In vitro and *in vivo* investigation of antilithiatic and antioxidant activity of aqueous extract of *Aerva lanata*

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CERTIFICATE

This is to certify that the thesis entitled "***In vitro* and *in vivo* investigation of antilithiatic and antioxidant activity of aqueous extract of *Aerva lanata***" submitted to Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore, for award of degree of **Doctor of Philosophy** in **Biotechnology**, is a record of original research work done by **Shrinidhi Rai. T.** during the period of her study in the Department of Biochemistry, Biotechnolgy and Bioinformatics, Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore, under my supervision and guidance and the thesis has not formed the basis for the award of any Degree/ Diploma/ Associateship/Fellowship or similar title to any candidate of any University.

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DECLARATION

I hereby declare that the matter embodied in this thesis entitled "***In vitro* and *in vivo* investigation of antilithiatic and antioxidant activity of aqueous extract of *Aerva lanata***" is the result of investigation carried out by me in the Department of Biochemistry, Biotechnology and Bioinformatics, Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore, under the supervision and guidance of **Dr. R Nirmaladevi**, Assistant Professor, Department of Biochemistry, Biotechnolgy and Bioinformatics, Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore, and that it has not been submitted for the award of any Degree/ Diploma/ Associateship/ Fellowship etc., of any other University or Institute.

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Shrinidhi Rai T

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LIST OF ABBREVIATIONS

µg	-	microgram
µL	-	microlitre
^{1}H -NMR	-	Proton Nuclear Magnetic Resonance
A	-	Absorbance
AAPH	-	2,2'-Azo-Bis(2-AmidinoPropane) dihydro chloride
ABTS	-	2, 2'-Azino-Bis (3-ethyl benzo- Thaizoline-6-Sulfonic acid)
ALT	-	Alanine Transaminase
ANOVA	-	Analysis of Variance
ANSA	-	1-Amino-2-Napththol-6-Sulphonic acid
AST	-	Aspartate Transaminase
BHT	-	Butyl Hydroxy toluene
C.D.	-	Critical Difference
C.V.	-	Critical Variance
CaC_2O_4	-	Calcium Oxalate
CaOx	-	Calcium Oxalate
Cap	-	Calcium Phosphate stones
CAT	-	Catalase
CDNB	-	Chloro-2, 4 – Di Nitro Benzene
cm	-	Centimeter
CO_2	-	Carbon Dioxide
COD	-	Calcium Oxalate Dihydrate
COM	-	Calcium Oxalate Monohydrate
Conc.	-	Concentrated
COT	-	Calcium Oxalate Trihydrate
CT scan	-	Computer Tomography
dia	-	Diameter
dL	-	Deci Litre
DMEM	-	Dulbecco's Modified Eagles Medium
DMRT	-	Duncan's Multiple Range Test
DNA	-	Deoxyribo Nucleic Acid
DNPH	-	2,4 – Dinitrophenyl hydrazine
DPPH	-	2, 2-diphenyl-2-Picryl Hydrazyl Hydrate
DPX	-	Dibutyl Phathalate Xylene
DTNB	-	5, 5'-Di Thio-bis-2-Nitro Benzoic acid
EDTA	-	Ethylene Diamine Tetra Acetic acid
EG	-	Ethylene glycol
ELISA	-	Enzyme Linked Immuno Sorbent Assay
ESWL	-	Extracorporeal Shock Wave Lithotripsy
FAO	-	Food and Agriculture Organization

FCS	-	Fetal Calf Serum
FTIR	-	Fourier Transform Infrared Spectroscopy
g	-	Gram
GAGs	-	Glycos Amino Glycans
GC-MS	-	Gas Chromatography-Mass Spectrometry
GSH	-	Reduced Glutathione
GST	-	Glutathione -S-Transferase
h	-	Hour
H_2O	-	Water
H_2O_2	-	Hydrogen peroxide
H_2SO_4	-	Sulphuric acid
HAP	-	Carbapatite or Hydroxyl Apatite
HCl	-	Hydro Chloric acid
HNO_3	-	Nitric acid
HPLC	-	High Performance Liquid Chromatography
HPTLC	-	High Performance Thin Layer Chromatography
HSD	-	Honest Significant Difference
Ir per cent	-	Inhibitory per cent
IU	-	International Units
kg	-	Kilogram
KH_2PO_4	-	Potassium dihydrogen phosphate
KOH	-	Potassium hydroxide
LDH	-	Lactate Dehydrogenase
LiOH	-	Lithium hydroxide
M	-	Molar
mg	-	milligram
mL	-	milli Litre
mM	-	milli Molar
mm	-	millimeter
MTT	-	2-(4,4-diMethyl-2-Tetrazoyl)-2,5-diphenyl-2,4,Tetrazolium salt
N	-	Normality
Na_2CO_3	-	Sodium carbonate
NaCl	-	Sodium chloride
NADH	-	Nicotinamide Adenine Dinucleotide - Hydrogen
NADPH	-	Nicotinamide Adenine Dinucleotide Phosphate
NaOH	-	Sodium hydroxide
NBRI	-	National Botanical Research Institute
NH_4OH	-	Ammonium hydroxide
nm	-	nanometer
NRK 52E	-	Norma Rat Kidney Cells 52 Epithelial cells
O.D.	-	Optical Density

O_2	-	Oxygen
$O_2^{\bullet-}$	-	Superoxide anion radical
OCP	-	Octa calcium Phosphate
$OH^{\bullet}$	-	Hydroxyl radical
OPN	-	Osteopontin
PBS	-	Phosphate Buffered Saline
PCNL	-	Per Cutaneous Nephro Lithotomy
PDA	-	Photo Diode Array
Pet Ether	-	Petroleum Ether
PMS	-	Phenazine Metho Sulphate
PPO	-	Poly Phenol Oxidase
PS	-	Phosphatidylserine
PTFE	-	PolyTetraFluroEthylene
RCF	-	Relative Centrifugal Force
R_f	-	Retardation/Retention Factor
ROS	-	Reactive Oxygen Species
rpm	-	Revolutions Per Minute
S.D.	-	Standard Deviation
SCP	-	Sodium Cellulose Phosphate
SOD	-	Superoxide Dismutase
SPSS	-	Statistical Package for the Social Sciences
SRB	-	Sulphorhodamine B
SS	-	Super Saturation
TBARS	-	Thio Barbituric Acid Reactive Substances
TCA	-	Tri Chloro Acetic acid
THP	-	Tamm-Horsfall Protein
TLC	-	Thin Layer Chromatography
TMS	-	Tetra Methyl Silane
U	-	Units
UV	-	Ultra Violet rays
v/v	-	Volume by Volume
w/v	-	Weight by Volume
Wt.	-	Weight
α - KG	-	Alpha Keto Glutarate

LIST OF PUBLICATIONS

- **Shrinidhi, T.,** Kalpana, S. and Nirmaladevi, R. (2014) Evaluation of selected medicinal plants for its antilithiatic potential under *in vitro*, *Am. J. Pharm. Health Res*., 2: 203-212.
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